An Energy Efficiency Workshop & Exposition

Kansas City, Missouri

Implementing Energy Projects through the Natural Gas LDC

Nicor Gas - Fermilab UESC

Jim Vallort

Nicor Project Director

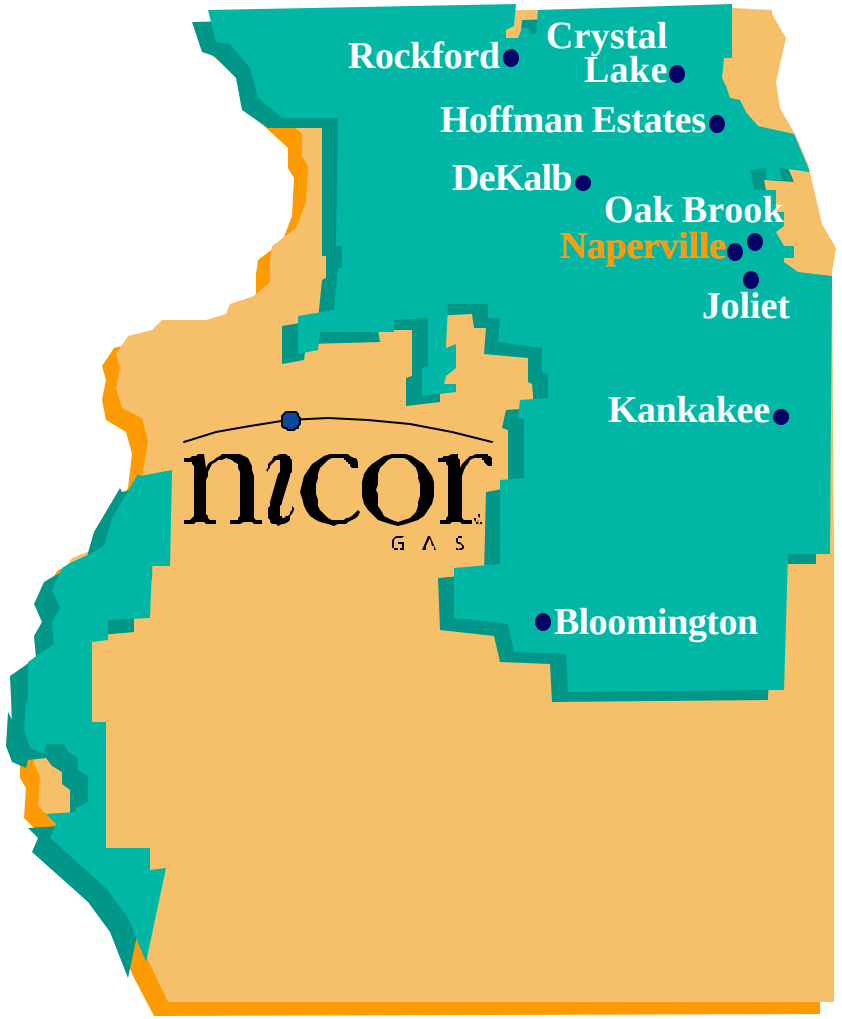
Presentation Agenda

- Who is Nicor?
- Who is Fermilab?
- Fermilab UESC History
- Initial Program Concerns
- Lessons Learned
- Conclusion

Note: Any time during the presentation please feel free to ask questions. They will be addressed immediately or recorded to be answered later in the presentation.

Who is Nicor Gas

- Nicor Gas -- one of the largest gas distribution companies in the U.S., with 1.9 million customers, primarily in suburban Chicago
- Tropical Shipping
- Nicor Energy LLC
- Nicor Technologies
- Nicor Hub Services
- Nicor Energy Services
- Nicor Solutions



Nicor Services

- Facility Audits
- Performance Contracting
- Fuel Line Installation
- Water Conservation Audits
- Lighting Retrofits
- Turn-key Financing
- Energy Management Control Systems
- Design / Build Project Delivery
- Project / Construction Management

Nicor Expertise

- A very diverse engineering group able to evaluate a variety of project scopes
  - Mechanical, electrical, DDC controls, civil, operations, rate tariffs, environmental, and a network of outside specialty consultants
- HVAC / Air Conditioning
- Cogeneration / Power Generation
- Underground Piping (Water, gas etc.)
- High Voltage Electrical Design and Installation

Nicor Expertise

- Clean Fuel Fleet Services
- Natural Gas and Electric Commodity
- Process Conversions
- Gas Engine-drive Applications
  - Air compressors, pumps, large motor conversions
- Facility Operations & Maintenance Management

Nicor Gas as Your Partner

- Nicor Gas is financially strong
- Nicor Gas is well diversified throughout the energy market
  - Aware of developing technologies
  - Fuel Neutrality
  - Product Neutrality
- Nicor Gas is here to stay
  - Nicor Gas headquarters is located in Naperville less than 5 miles from Fermilab
  - Committed regional focus

Nicor Gas Corporate Support

- **Accounting**
- **Community Relations**
- **Corporate Communications**
- **Corrosion Control**
- **Economic Development**
- **Engineering**
- **Government Relations**
- **Human Resources**
- **Information Systems**
- **Marketing Communications**
- **Material Handling**
- **Measurement**
- **Procurement**
- **Quality Assessment & Welding**
- **Safety**
- **Tax Administration**

Who Is Fermilab

- U.S Dept. of Energy national laboratory for research of matter and energy
- Home of the worlds most powerful particle accelerator
- Over 2,000 employees onsite

Fermilab Site Overview

- 6,800 acre site is separated into several distinct zones which include:
  - (1) Wilson Hall - 16 story main office
  - (2) Lineac / Booster Gallery
  - (3) Central Utilities Bldg. (CUB)
  - (4) Ring sites
  - (5) Industrial Complex
  - (6) Residential Village Complex
  - (7) Shipping & Receiving Warehouses

Site Walk Through

- Over 400 building - nearly 2 million SF of building space divided among:
  - administrative spaces
  - lab spaces
  - storage facilities
  - residential units
  - equipment spaces

Site Utility Consumption

- Process loads are the dominant power consumer therefore the site enjoys an abnormally flat baseline of electric consumption.
  - Current annual use is approximately 375,000 MWh with a peak demand of roughly 50MW at an annual cost of $18M.

Site Utility Consumption

- Gas is used primarily for facility heating.
- Current annual use is approximately 112,000 mcf with an associated cost of $431,000.

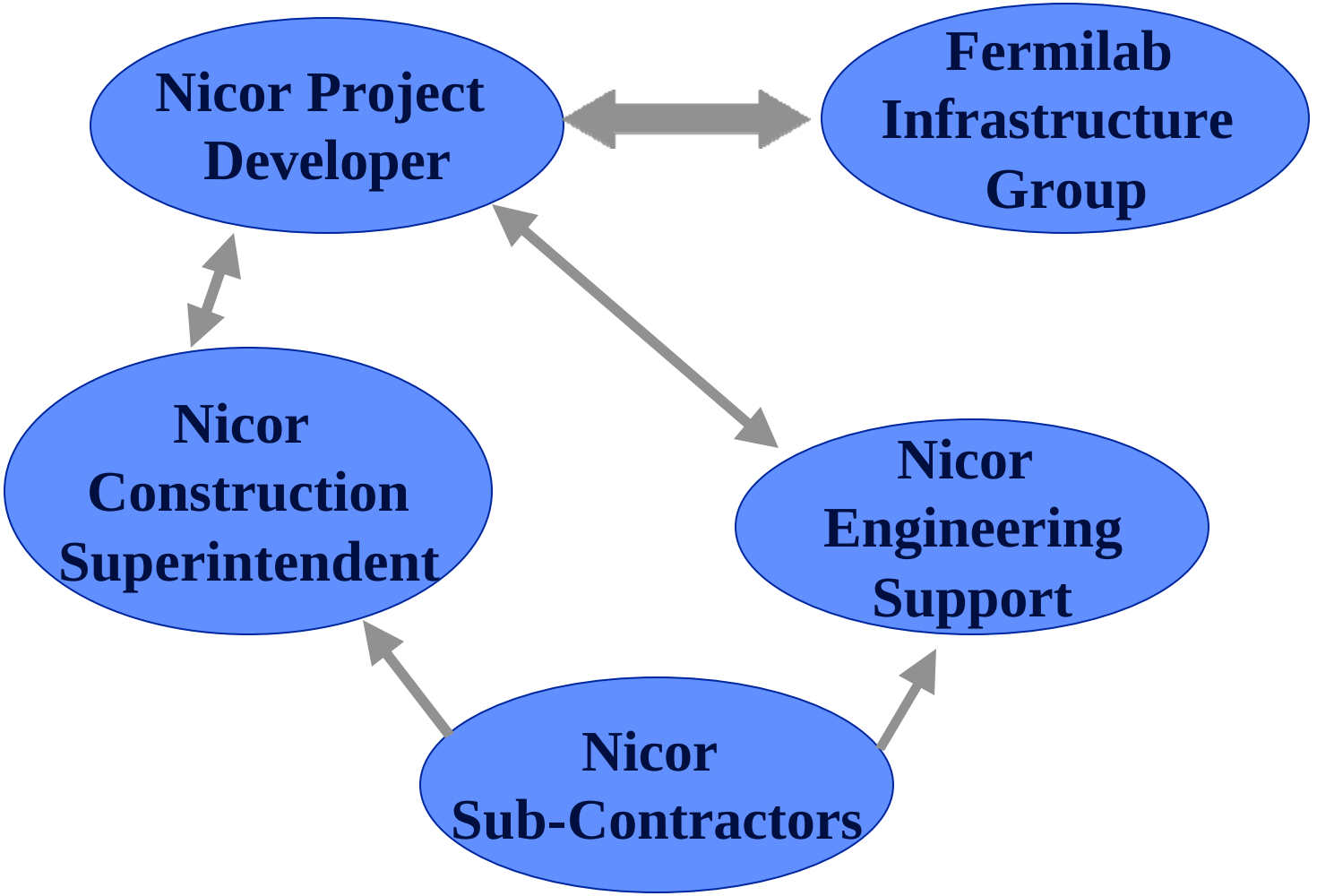
Fermilab UESC History

- Initial project had a focused scope
  - 90% complete design of chiller replacement
  - Competed UESC's head to head
  - Bids received were 20% lower than budget and within 1% of each other

Second phase - Sitewide

- 2nd phase started as a site-wide audit with a list of possible Energy Conservation Measure (ECM) and Infrastructure projects (IP) projects provided by Fermilab
- Decided award would be split between both parties due to the size of the campus and diversity of projects
- Two teams competing for the same projects

Partnership Between Fermilab and Nicor Gas



Proposal Process Milestones

ECP Pricing Accuracy	Date	Milestone
N/A	11/01/1999	UIP Audit Kickoff Meeting
+ or - 20%	12/15/1999	Preliminary Proposal Due to Fermilab
+ or - 20%	01/31/2000	PEC submits writen questions on proposals
+ or - 20%	02/14/2000	Response to proposal questions completed
+ or - 10%	03/02/2000	Nicor oral proposal presentation to Fermilab
+ or - 10%	03/15/2000	Fermilab assigns FY00 work scopes
Final	04/03/2000	Completion of deliver order for FY00 ECM's
	Ongoing	Future ECP investigation and evaluation

Project Phases

- The projects could be divided into four common phases for the program.
  - Proposal
  - Analysis
  - Design
  - Implementation

Proposal Phase

- The proposal phase is complete for FY00 & 01 projects but is ongoing for all future projects.
- This phase includes the interaction between the infrastructure team of Fermilab and Nicor Gas

Analysis Phase

- The analysis phase moves projects from the conceptual design to schematic design
- The phase also increases the confidence of the project pricing and savings

Design Phase

- The design phase includes the production of project drawings and specifications for Fermilab review
- This phase may occur as a stand-alone award or as a Design/Build award

Implementation Phase

- The implementation phase includes the construction of the actual project.
- The phase is not complete until the project has completed M&V verification, as-built drawing submittal and applicable training

5 Year Implementation Plan

- This plan was developed to meet the goals and objectives of;
  - Executive Order 13123
  - DOE order 430.2
  - Public Law USC 8256
- These all call for establishing a comprehensive approach to site management initiatives as a program not just traditional individual retrofits.

5 Year Implementation Plan

- 5 year plan provided in proposal binder
- The majority of the FY01 and beyond projects are slated for feasibility study
- The feasibility projects will feed future design build and construction projects

2000 Implementation Plan

- 30 Design build and construction projects with a total cost $16.6 MM
- 38 Feasibility and/or design projects
- $1.63 MM total S1 savings

2000 Implementation Plan

- Pond Pumping Applications
- Assorted HVAC Projects
- Lighting Applications
- Central Utilities Building (CUB)
- Electrical Feeder and Infrastructure Projects
- Site Civil and Water Projects
- Building Controls (DDC)
- Specialty Projects

Initial Program Concerns

- Project Estimates
- Finance Market Volatility
- Access
- Availability of Fermi Resources
- Timeliness of Joint Reviews and Approval
- Major mission change for Fermi

Project Estimates

- Accuracy of Project Costs and Savings
- Solutions:
  - Firm fixed pricing for feasibility studies, design, and construction activities
  - Conservative estimation of savings:
    - Modeling of savings
    - Fermi review and approval of modeling prior to contract award

Finance Market Volatile

- May impact the way ECP's are packaged into ECM's
- Solutions:
  - Nicor will work with Fermilab to evaluate the most advantageous way to bundle ECP's to reduce interest costs.
  - Nicor and its financial partner will look at refinancing existing ECM's with new ECM's

Access to Work Areas

- Limited access to work area will delay work on ECP's within that area and could impact the completion of other work in other areas.
- Solution:
  - Project Developer and Supervisor will communicate to Fermilab the anticipated work schedules and locations where access is needed.

Availability of Fermilab Resources

- Limited availability could extend time required for all phases of individual ECP's
- Solutions:
  - Nicor Project Developer will develop project timelines and will specify when and what Fermilab resources will be needed.
  - If unexpected changes occur, the Project Developer will work with Fermilab Infrastructure Group to reschedule.

Timeliness of Joint Reviews and Approval

- Lack of timeliness may cause lost opportunities and misunderstandings between Nicor, Fermilab and subcontractors
- Solution:
  - Nicor Project Developer will be responsible for scheduling and holding the joint review meetings.
  - Meeting schedule will be approved by Fermilab.

Major Changes to Fermilab Operations

- Major mission change for Fermilab
- Solutions:
  - Timely communication between Fermilab and Nicor Project Developer.
  - Nicor and Fermilab commitment to review and change Long Range Plan based on above issues

Lessons Learned

Project Prioritization

- To each department, their project is most important
- Projects must balance the infrastructure needs, maintenance and energy savings
- Projects must match the schedule of the lab and mother nature

Program Start-up Delays

- Getting to know the site
- Getting to know the resources
- Getting to know the players
- Learning the procedures
- Learning the site history
- Understanding the long range goals
- Understanding the product of the site

Team Regrouping Meeting

- After six months an all hands meeting to share lessons learned
- Scope creep
  - Not a bad thing, but needs to be controlled
- Deliverable expectations
  - Communication! Before - During - After
- Teamwork
  - Combined the utility and the lab can complete any challenge

Project Bundling

- Bundling of projects to help support less favorable but needed projects
  - Less favorable may be low energy savings but high maintenance savings
- Implement projects that improve reliability and mitigate system / site vulnerabilities.
- Work with the Fermilab departments to identify energy saving projects

Energy savings vs Capital vs The Right Thing To Do!

- How do you fund the right solution when you discover the problem is bigger then you estimated!!
- Many projects were delayed to allow for the right solution to be installed
- New and better ideas mid project result in re-scoping and adjusting schedules

Questions and Answers